

Appl. No. 10/805,119

Amdt. Dated June 30, 2006

Reply to Office Action of April 6, 2006

REMARKS

This is a full and timely response to the non-final Office Action mailed April 6, 2006. Further examination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 1-20 are pending in this application, with claims 1, 12, and 15 being the independent claims. Claims 1, 2, 5, 12, 15, and 16 have been amended. No new matter is believed to have been added.

Objection to the Drawings

At page 2 of this Office Action, Figures 1 and 2 are objected to under MPEP § 608.02(g) "because only that which is old is illustrated." Figures 1 and 2 have been corrected to include the legend "Prior Art" and submitted herewith on a replacement sheet.

Objection to the Specification

At page 2 of this Office Action, the specification is objected to as "failing to provide proper antecedent basis for the claimed subject matter", namely the term "fifth region". Claims 18-19 recite the term "fifth region". As shown in FIG. 4 and discussed in the Specification, ¶¶ 30, 34, 35, a p-type region 390 represent the "fifth region" in the exemplary embodiment set forth by claims 18-19. Applicants submit that proper antecedent basis is therefore provided by the Specification and respectfully requests that this objection be withdrawn.

Rejections Under 35 U.S.C. § 102

At page 2 of this Office Action, claims 1-14 and 17 are rejected under 35 U.S.C. § 102 as allegedly "being anticipated by applicants own acknowledge prior art" (APA). This rejection is respectfully traversed because the APA does not disclose all of the elements of claim 1.

Claim 1 is amended to recite

"a first region of said first type formed in said base region, said first region configured to redistribute current away from a surface of said base region to increase a peak current handled by the ESD protection device; and

a second region of said first type formed in said first region, said second region coupling to the second terminal of the ESD protection

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device [emphasis added].”

Claim 12 is amended to recite

“enabling a transistor with said impact ionization current to dissipate said ESD event before the semiconductor device is damaged wherein said impact ionization current is distributed uniformly through a base region of said transistor via a first region formed in said base region to prevent current crowding at a surface of said base region, the first region having a doping concentration greater than a doping concentration of said base region and having a second region formed in said first region, the second region having a doping concentration greater than said doping concentration of said first region [emphasis added].”

It is alleged that the APA discloses a zener diode as recited in claim 1. It is further alleged that the APA discloses the enabling step recited in claim 12. While the APA mentions that impact ionization current is generated by the zener diode when the breakdown voltage of the zener diode is exceeded, the APA does not disclose the first region (420) and the second region (380) as recited in amended claims 1 and 12. The first region (420) is formed in the base region (430), and the second region (380) is formed in the first region (420) (see FIG. 4). At best, the APA discloses regions 140 and 145 that are formed in the base region but separated from one another (see FIG. 1).

Additionally, while a general discussion is provided in the APA regarding the normal operation of the transistor 25 and Zener diode 30, the APA does not specifically disclose “said first region configured to redistribute current away from a surface of said base region to increase a peak current handled by the ESD protection device”. Nothing is specifically mentioned in the APA regarding increasing peak current handling of the ESD protection device. The APA also does not specifically disclose that “impact ionization current is distributed uniformly through a base region of said transistor via a first region formed in said base region to prevent current crowding at a surface of said base region”. Nothing is specifically mentioned in the APA regarding uniform distribution of impact ionization current and preventing current crowding at the surface of the base region. In support of this, “[i]t is believed that the failure at the base terminal of the device occurs due to high currents flowing near the surface of the transistor due to currents from the zener diode and the lateral transistor that couple to the base terminal.” See Specification,

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¶ 15.

Applicants submit that amended independent claims 1 and 12 are patentably distinguished from the APA. Because of the foregoing discussion and because claims 2-11 and 13-14 depend from one of amended independent claims 1 and 12 or an intermediate claim depending therefrom, Applicants submit that claims 2-11 and 13-14 are likewise patentably distinguished from the APA.

Regarding claim 17, claim 17 depends from an intermediate claim (i.e., claim 16) which depends from independent claim 15. At page 6 of this Office Action, claim 15 is rejected under 35 U.S.C. § 103(a). Applicants submit that the rejection of claim 17 was erroneously made under 35 U.S.C. § 102(b) and should properly be presented with the aforementioned rejection of claim 15. Applicants respectfully submit that the rejection of claims 1-14 and 17 has been overcome.

Rejections Under 35 U.S.C. § 103

Claim 15 is rejected under 35 U.S.C. § 103 as allegedly being unpatentable over applicants own acknowledged prior art (APA) in view of Baliga (U.S. Patent 6,365,462). Claims 18-20 are rejected under 35 U.S.C. § 103 as allegedly being unpatentable over applicants own acknowledged prior art (APA) in view of Snyder et al. (U.S. Patent 4,367,509). These rejections are respectfully traversed because the cited references, either alone or in combination, do not disclose or suggest all of the elements of the claimed invention.

Claim 15 is amended to recite "a second region of said first type formed in said first region". As previously mentioned, the APA does not disclose the first region (420) and the second region (380) as recited in amended claim 15. The first region (420) is formed in the base region (430), and the second region (380) is formed in the first region (420) (see FIG. 4). Baliga is cited for disclosing "the depth of the first region of the first type greater than 30% of the depth of the base region", and Snyder is cited for disclosing "the fifth region". Baliga and Snyder also do not disclose or suggest a base region, a first region formed in the base region, and a second region formed in the first region.

Because the APA does not disclose all of the elements of amended claim 15, amended claim 15 is patentably distinguished from the cited references. Because of the

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foregoing discussion regarding the patentability of amended independent claims 1, 12 and 15 and because claims 16-20 depend from amended independent claim 15 or an intermediate claim depending therefrom, claims 16-20 are likewise patentably distinguished from the cited references, either alone or in combination. Applicants respectfully submit that the rejection of claims 15-20 has been overcome.

Conclusion

Based on the above, independent claims 1-20 are patentable over the citations of record. The dependent claims are also submitted to be patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicants have not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

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